Claims

1) Innovative ophthalmic lens for nearsightedness, in particular medium/high to very high nearsightedness, either single-vision or multifocal, in plastic, mineral or other suitable material, lighter and thinner at the edges, with a wide visual field, cosmetically attractive, manufactured as a finished or semi-finished lens and characterised by the fact that a back surface with a centrally spherical area (2) and an aspheric area, both asymmetrical to the optical centre of the lens and varying in width according to the refractive correction and the diameter of the lens.

2) Ophthalmic lens according to claim 1, characterised by the fact that the aforementioned centrally spherical area (2) which defines the refractive correction of the lens and has a width equalling 70% of the diameter DD'.

3) Ophthalmic lens according to claim 1 or 2, characterised by the fact that the aforementioned aspheric area which, in turn, consists of a paracentral area (3), which encompasses the spherical area (2), is tangential to it and has a diameter width of approximately 10% of the reference diameter DD', and a peripheral area (4) which encompasses the paracentral area, is tangential to it and stretches down to the lens edge.

4) Ophthalmic lens according to claim 3, characterised by the fact that the aforementioned spatially connected three areas.

5) Ophthalmic lens according to one of the above claims, characterised by the fact that a surface end-profile which contains a series of portions of spherical surfaces.

6) Ophthalmic lens according to claim 5, characterised by the fact that a first surface – the one defining the central area of curvature – resulting from the intersection between the semi-finished lens and a sphere having a radius R, the centre of which lies on a straight line passing through C and perpendicular to the base of the semi-finished product.

7) Ophthalmic lens according to claim 5 or 6, characterised by the fact that the aforementioned aspheric area of the lens, consisting of a number of spherical portions equal to their total number minus one, which is designed so that its axis is inclined with respect to the axis of the central area of an appropriate angle.

8) Ophthalmic lens according to claim 7, characterised by the fact that a decreasing refractive correction from the centre to the periphery of each of the portions of the spherical surfaces which make up the aspheric area.

9) Ophthalmic lens according to claim 7, characterised by the fact that a number of portions of the spherical surfaces which make up the aspheric area that ensure the accuracy of spatial connections.

10) Ophthalmic lens according to one of the above claims, characterised by the fact that a concurrent action of the inclination of the axis of the aspheric periphery of the lens with respect to the axis of the centrally spherical area and the radial reduction in power towards the outmost edge of the lens which contributes to making the lens surface

asymmetrical, while diminishing the asymmetrical thickness at the periphery.

11) Ophthalmic lens according to one of the above claims, characterised by the fact that an angle δ' at the periphery of the lens which causes the reflections of edging to converge outside the lens, thus nullifying the "coke bottle" effect.

12) Ophthalmic lens according to one of the above claims, characterised by the fact that a "semi-finished" lens derived from a blank and obtained by finishing only the back side with a given dioptric power.

13) Ophthalmic lens according to one of the above claims, characterised by the fact that a "finished" lens obtained from a semi-finished with a conventionally finished front surface in a given dioptric power, by finishing the back side so as to give the lens the prescribed power.

14) Ophthalmic lens according to one of the above claims, characterised by the fact that, regardless of the interpupillary distance of the wearer, centering is done such that the central area (with a constant power) and the paracentral area (with a power very close to the central power) of the lenses cover most of the width of the eyeglasses, whereas the periphery, with a more marked power drop, solely covers the temple area. Hence, the eyeglasses ensure the wearer visual acuity in all directions of the gaze and are fit with lighter and thinner lenses with low spherical aberration and no edging reflections.

15) Manufacturing process of an ophthalmic lens according to one of the above claims from 1 to 13, characterised by CNC machining which

guarantees great accuracy in forging all free-form surfaces, good quality and low costs.

16) Manufacturing process of an ophthalmic lens according to one of the above claims from 1 to 13, characterised by moulding processes or, in the case of thermoset plastic materials, injection moulding in ready-made moulds at low costs.

17) Manufacturing process of an ophthalmic lens according to one of the above claims from 1 to 13, characterised by non-industrial machining and, in particular, two steps of rough grinding, one step of lapping and one step of polishing.

18) Manufacturing process according to claim 17, featuring a first rough grinding step which consists of removing stock from the back side of a semi-finished, thus generating a spherical surface, called principal base.

19) Manufacturing process according to claim 17 or 18, characterised by a second rough grinding step which consists of generating a surface (the so-called secondary base), the value of which is a predetermined fraction of the principal base and the axis of which is inclined with respect to the axis of the principal base.

20) Manufacturing process according to claims 17 to 19, characterised by a lapping step consisting of lapping first the primary base and the secondary base, then, using any number of spherical tools with a base ranging between the principal and the secondary base, eliminating the cusps between the various portions of spherical surfaces which are formed at every stroke so as to obtain a gradual transition from the lens edge to the centre.

21) Manufacturing process according to claim 20, characterised by a sequential value to be assigned to the base of the n-tool, which results from the arithmetical mean between the base of the portion of the reference surface and the externally adjacent portion, and a stock removal depth whereby each stroke removes approximately half of the innermost surface, selected as a reference surface.

22) Manufacturing process according to claim 20 or 21, characterised by a lapping step during which a rod, via a ball-and-socket joint, transmits oscillations to the lens which is kept flush with the n-tool and self-centres on the temporary chamfer produced by the intersection between the various previously used bases, thus taking on a different inclination.

23) Manufacturing process according to claims from 20 to 22, characterised by a lapping step in which a tool can be used as last which is made of a resistant but soft material and the curvature of which is the mean of the previously used tools.

24) Manufacturing process according to claims from 17 to 23, characterised by a polishing step which makes use of very fine abrasives and follows the same steps of lapping.